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TITLE: The temperature in the contact zone of a worm pair

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TEXT: The author describes the methods and results of experimentally determining the surface-adjacent layer temperature (up to 0.5 mm) in the contact zone of a worm during the operation of the reducer. The investigations were carried out on an industrial-type self-greasing worm reducer with lower arrangement of the worm. The experiments have shown that in the case of a steel-bronze worm pair, the temperature in the surface-adjacent layer of the contact zone exceeds the temperature of the greasing oil by not over 15% if the contact gear stress $\sigma_g = 1750 - 2000 \text{ kg/cm}^2$, the slip rate is up to 4 m/sec, and continuous liquid greasing is performed. A slight increase in the temperature of the surface-adjacent layer of the contact zone metal over the greasing-oil temperature is explained by the intensive heat exchange between the high-speed rotating worm and

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the greasing oil. If the continuous process of greasing is interrupted (dry friction), the temperature in the contact zone rises sharply. This increase was 40 - 70°C per hour for the investigated reducer during the first hours of its operation without grease. The consequence of such a high temperature increase in dry friction may be galling of the operational surfaces, increased wear, and rapid failure of the drive. The temperature of the contact zone was experimentally measured and was found to be in agreement with calculated values obtained by A. I. Pestov's method. When liquid grease was used and depending on the load, the measured temperature was only 7 - 10% below the calculated value for the investigated reducer.

[Abstracter's note: Complete translation]

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